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MINERALOGY.—*Supplementary note on the crystal form of hodgkinsonite.*[1] C. PALACHE, Harvard University. Communicated by W. T. Schaller.

Through the kindness of Mr. McGovern of Franklin Furnace the writer has been supplied with specimens of a second occurrence of the new mineral hodgkinsonite. These are in the form of veins from 3 to 7 cm. in width consisting of a granular mixture of hodgkinsonite and willemite; the veins cut the normal franklinite ore with well defined boundaries.

The material of the veins is in large part compact but at quite irregular intervals there occur tiny cavities upon whose walls are implanted excellent crystals of hodgkinsonite. The crystals do not exceed 2 mm. in length but they are clear and brilliant and give measurements so much better than any obtained on the first-found specimens that the elements have been recalculated and a new table of angles is here presented containing the new data. It will be seen that the forms include the better ones of the first list together with several new ones; the habit is however entirely similar to that first described, the acute pyramids formed by combination of two prisms and two pyramid faces, *m* and *r*, having their summits more or less modified by the other planes. The forms previously described as etch forms have not been found on these crystals and they may well be dropped from the form series of the mineral. Nine crystals were measured and gave a

[1] Hodgkinsonite, a New Mineral from Franklin Furnace, N. J. C. Palache and W. T. Schaller, this Journal, **3**: 474. 1913.

very consistent set of observations which together with the calculated angles and new elements are shown below.

HODGKINSONITE

$p_0=0.7201$ $q_0=1.1025$ $\mu=84° 35'$ $a:b:c=1.538:1:1.1075$ $\beta=84° 35'$

		CALCULATED		MEASURED		LIMITS		NO. OF FACES
		φ	ρ	φ	ρ	φ	ρ	
c	(001)	90° 00′	5° 25′	90° 00′	5° 27′		5° 18′– 5° 36′	8
m	(110)	33° 09′	90° 00′	33° 09′	90° 00′	33° 05′–33° 13′		19
l	(210)	52° 33′	90° 00′	52° 33′	90° 00′			1
s	(011)	4° 54′	48° 01′	4° 54′	48° 01′	4° 43′– 5° 04′	47° 58′–48° 03′	16
o	(021)	2° 27′	65° 44′	2° 30′	65° 42′	2° 27′– 2° 37′	65° 38′–65° 45′	12
v	($\bar{4}03$)	−90° 00′	41° 01′	−90° 00′	40° 50′		40° 43′–40° 57′	2
w	($\bar{2}01$)	−90° 00′	53° 30′	−90° 00′	53° 28′		53° 20′–53° 37′	8
t	($\bar{4}01$)	−90° 00′	70° 20′	−90° 00′	70° 20′		70° 14′–70° 25′	4
p	(111)	36° 27′	54° 00′	36° 35′	54° 04′			1
r	(221)	34° 50′	69° 40′	34° 49′	69° 41′	34° 47′–34° 51′	69° 37′–69° 47′	12
n	($\bar{3}11$)	−61° 55′	66° 58′	−62° 00′	67° 00′	61° 58′–62° 03′		2

GEOLOGY.—*The transportation of débris by running water.*[1] G. K. GILBERT, based on experiments made with the assistance of EDWARD CHARLES MURPHY.

Scope. The finer débris transported by a stream is borne in suspension. The coarser is swept along the channel bed. The suspended load is readily sampled and estimated, and much is known as to its quantity. The bed load is inaccessible and we are without definite information as to its amount. The primary purpose of the investigation was to learn the laws which control the movement of bed load, and especially to determine how the quantity of load is related to the stream's slope and discharge and to the degree of comminution of the débris.

Method. To this end a laboratory was equipped at Berkeley, Cal., and experiments were performed in which each of the three conditions mentioned was separately varied and the resulting variations of load were observed and measured. Sand and gravel were sorted by sieves into grades of uniform size. Determinate discharges were used. In each experiment a specific

[1] Abstract of U. S. Geological Survey Professional Paper 86. (In press.)

load was fed to a stream of specific width and discharge, and measurement was made of the slope to which the stream automatically adjusted its bed so as to enable the current to transport the load.

The slope factor. For each combination of discharge, width, and grade of débris there is a slope, called competent slope, which limits transportation. With lower slopes there is no load, or the stream has no capacity[2] for load. With higher slopes capacity exists; and increase of slope gives increase of capacity. The value of capacity is approximately proportional to a power of the excess of slope above competent slope. If S equal the stream's slope and σ equal competent slope, then the stream's capacity varies as $(S—\sigma)^n$. This is not a deductive, but an empiric law. The exponent n has not a fixed value, but an indefinite series of values depending on conditions. Its range of values in the experience of the laboratory is from 0.93 to 2.37, the values being greater as the discharges are smaller or the débris is coarser.

The discharge factor. For each combination of width, slope, and grade of débris there is a competent discharge, κ. Calling the stream's discharge Q, the stream's capacity varies as $(Q—\kappa)^o$. The observed range of values for o is from 0.81 to 1.24, the values being greater as the slopes are smaller or the débris is coarser. Under like conditions o is less than n; or, in other words, capacity is less sensitive to changes of discharge than to changes of slope.

The fineness factor. For each combination of width, slope, and discharge there is a limiting fineness of débris below which no transportation takes place. Calling fineness (or degree of comminution) F and competent fineness ϕ, the stream's capacity varies with $(F—\phi)^p$. The observed range of values for p is from 0.50 to 0.62, the values being greater as slopes and discharges are smaller. Capacity is less sensitive to changes in fineness of débris than to changes in discharge or slope.

The form factor. Most of the experiments were with straight channels. A few with crooked channels yielded nearly the same

[2] *Capacity* is defined for the purposes of this paper as the maximum load of a given kind of débris which a given stream can transport.

estimates of capacity. The ratio of depth to width is a more important factor. For any combination of slope, discharge, and fineness it is possible to reduce capacity to zero by making the stream very wide and shallow or very narrow and deep. Between these extremes is a particular ratio of depth to width, ρ, corresponding to a maximum capacity. The values of ρ range, under laboratory conditions, from 0.5 to 0.04, being greater as slope, discharge, and fineness are less.

Velocity. The velocity which determines capacity for bed load is that near the stream's bed, but attempts to measure bed velocity were not successful. Mean velocity was measured instead. To make a definite comparison between capacity and mean velocity it is necessary to postulate constancy in some accessory condition. If slope be the constant, in which case velocity changes with discharge, capacity varies on the average with the 3.2 power of velocity. If discharge be the constant, in which case velocity changes with slope, capacity varies on the average with the 4.0 power of velocity. If depth be the constant, in which case velocity changes with simultaneous changes of slope and discharge, capacity varies on the average with the 3.7 power of velocity. The power expressing the sensitiveness of capacity to changes of mean velocity has in each case a wide range of values, being greater as slope, discharge, and fineness are less.

Mixtures. In general, débris composed of particles of a single size is moved less freely than débris containing particles of many sizes. If fine material be added to coarse, not only is the total load increased but a greater quantity of the coarse material is carried.

Modes of transportation; movement of particles. Some particles of the bed load slide; many roll; the multitude make short skips or leaps, the process being called saltation. Saltation grades into suspension. When particles of many sizes are moved together the larger ones are rolled.

Modes of transportation; collective movement. When the conditions are such that the bed load is small, the bed is molded into hills, called dunes, which travel downstream. Their mode of advance

is like that of eolian dunes, the current eroding their upstream faces and depositing the eroded material on the downstream faces. With any progressive change of conditions tending to increase the load, the dunes eventually disappear and the débris surface becomes smooth. The smooth phase is in turn succeeded by a second rhythmic phase, in which a system of hills travel upstream. These are called antidunes, and their movement is accomplished by erosion on the downstream face and deposition on the upstream face. Both rhythms of débris movement are initiated by rhythms of water movement.

Application of formulas. While the principles discovered in the laboratory are necessarily involved in the work of rivers, the laboratory formulas are not immediately available for the discussion of river problems. Being both empiric and complex, they will not bear extensive extrapolation. Under some circumstances they may be used to compare the work of one stream with that of another stream of the same type, but they do not permit an estimate of a river's capacity to be based on the determined capacities of laboratory streams. The investigation made an advance in the direction of its primary goal, but the goal was not reached.

Load versus energy. The energy of a stream is measured by the product of its discharge (mass per unit time), its slope, and the acceleration of gravity. In a stream without load the energy is expended in flow resistances, which are greater as velocity and viscosity are greater. Load, including that carried in suspension and that dragged along the bed, affects the energy in three ways. (1) It adds its mass to the mass of the water and increases the stock of energy pro rata. (2) Its transportation involves mechanical work, and that work is at the expense of the stream's energy. (3) Its presence restricts the mobility of the water, in effect increasing its viscosity, and thus consumes energy. For the finest elements of load the third factor is more important than the second; for coarser elements the second is the more important. For each element the second and third together exceed the first, so that the net result is a tax on the stream's energy. Each element of load, by drawing on the supply of

energy, reduces velocity and thus reduces capacity for all parts of the load. This principle affords a condition by which total capacity is limited. Subject to this condition a stream's load at any time is determined by the supply of débris and the fineness of the available kinds.

Flume transportation. In the experiments described above—experiments illustrating stream transportation—the load traversed a plastic bed composed of its own material. Other experiments were arranged in which the load traversed a rigid bed, the bottom of a flume. Capacities are notably larger for flume transportation than for stream transportation, and their laws of variation are different. Rolling is an important mode of progression. For rolled particles the capacity increases with coarseness, for leaping particles with fineness. Capacity increases with slope and usually with discharge also, but the rates of increase are less than in stream transportation. Capacity is reduced by roughness of bed.

Vertical velocity curve. The vertical distribution of velocities in a current is controlled by conditions. The level of maximum velocity may have any position in the upper three-fourths of the current. In loaded streams its position is higher as the load is greater. In unloaded streams its position is higher as the slope is steeper, as the discharge is greater, and as the bed is rougher.

Pitot tube. The constant of the Pitot velocity gage—the ratio between the head realized and the theoretic velocity head—is not the same in all parts of a conduit, being less near the water surface and greater near the bottom or side of the conduit.

ABSTRACTS

Authors of scientific papers are requested to see that abstracts, preferably prepared and signed by themselves, are forwarded promptly to the editors. Each of the scientific bureaus in Washington has a representative authorized to forward such material to this journal and abstracts of official publications should be transmitted through the representative of the bureau in which they originate. The abstracts should conform in length and general style to those appearing in this issue.

ASTROPHYSICS.—*The non-selective transmissibility of radiation through dry and moist air.* F. E. FOWLE, Astrophysical Journal **38**: 392. 1913.

The change in the transmissibility of radiation associated with atmospheric water-vapor between the wave-lengths 0.371μ and 1.74μ was first determined; this rendered possible the evaluation of the transmissibility of radiation by dry air vertically above Mount Wilson (1730 meters). In the following table are given, for a few selected wave-lengths, the coefficients of transmission for dry air, $a_{a\lambda}$, the factor for the change produced by atmospheric water-vapor when the amount of precipitable water is 1 cm., $a_{w\lambda}$, and the theoretical values for dry air computed from the theory of molecular scattering.

WAVE-LENGTH	μ 0.370	μ 0.400	μ 0.430	μ 0.460	μ 0.500	μ 0.600	μ 0.750	μ 1.000	μ 1.500
$a_{w\lambda}$	0.957	0.962	0.967	0.971	0.976	0.977	0.988	0.990	0.988
$a_{a\lambda}$ (observed)	0.683	0.757	0.808	0.851	0.885*	0.916*	0.977	0.987	0.990
$a_{a\lambda}$ (computed)	0.680	0.755	0.808	0.850	0.890*	0.946*	0.977	0.987	0.986

* Places of selective transmission.

The corresponding values of a_λ for air containing w cm. of precipitable water-vapor would be $a_{w\lambda}^{w} \cdot a_{a\lambda}$.

The transmission coefficient for dry air was then used for the determination of the number of molecules, N_0, per cc. of a gas at 760 mm. pressure and at 0°C. The result was

$$N_0 = 25.6 \times 10^{18},$$

found to correspond very closely with the present best value from other methods, 27 billion billion (Millikan). This mode of analysis shows that for dry air, except where selective absorption accurs, the depletion of the beam from the sun or other celestial body, as observed in

1910 and 1911 at Mount Wilson was caused almost wholly by molecular scattering. From 0.36μ to 0.50μ the depletion is practically wholly of this nature. Then come the great selective absorption bands, which except near the D lines, have been eliminated from this discussion. Even in the infra-red between these water-vapor bands, molecular scattering accounts for the observed depletion of radiation by the atmosphere.

The same analysis applied to atmospheric aqueous vapor shows that the observed absorption is very much too great to be accounted for by the number of water molecules present. The transmission coefficients found by various observers for liquid water, however (0.21μ to 0.50μ), are such as would be expected from this amount of water in vapor form. This leads to the inference that its absorption in liquid form in this region results from molecular scattering. The number of molecules, N_0, computed from the transmission coefficients of liquid water is about

$$N_0 = 28 \times 10^{15}.$$

The increased absorption connected with atmospheric water-vapor and the departure of the transmission coefficients from strict proportionality to the inverse fourth power of the wave-length in the sense that the coefficients for smaller wave-lengths are too high, leads to the inference that the vapor is loaded with something greater in size than molecules. This loading could be due to dust or iron, although there is not definite evidence why these should be proportional to the amount of water-vapor present. The presence of nuclei, formed by the action of the ultra-violet light of the sun on the moisture present in the air, seems perhaps the most satisfactory explanation.

In the above study the amount of water-vapor present in the air was measured by the depths of three calibrated selective absorption lines in the infra-red. The effect of scattering, which varies slowly and continuously with the wave-length, was eliminated. It has been shown in an earlier paper (*Astrophysical Journal*, **37**: 359. 1913) that the mean results of such determinations of the amount of aqueous vapor in the atmosphere agree with the mean results of estimates of it from observations with kites and balloons. F. E. F.

PHYSICS.—*Standard density and volumetric tables, 4th edition.* Bureau of Standards Circular No. 19. (In press.)

In this circular the following tables are included: Table 1 gives the density of water (according to P. Chappuis) at every tenth of a degree from 0°

to 40°C. Tables 2 to 8, inclusive, are standard density and specific gravity tables for ethyl alcohol. They are based on work done at this Bureau and published in Vol. 9, No. 3, of the Bulletin of the Bureau of Standards (Reprint No. 197). Tables 9 to 11, are similar tables for methyl alcohol. They are based on the work of Doroshevskii and Rozhdestvenskii. Tables 12 and 13 are density tables for sugar solutions. Tables 14 and 15 are density tables for sulphuric acid solutions. Tables 16 to 19 give the relation between specific gravity and degrees Baumé, in use in the United States. Table 20 is for changing the density basis of hydrometers and picnometers. Table 21 gives the weight of a liter of air at various pressures and temperatures. Table 22 gives the difference between the weight of 1 cc. of water in vacuo and in air at various pressures and temperatures. Table 23 gives the apparent weight of various volumes of water at various temperatures when weighed against brass weights in air. Table 24 gives the temperature correction for glass volumetric apparatus. Tables 25 to 37 give the corrections to be applied to the weight of water, in air, to give the capacity of glass volumetric apparatus. Table 38 gives the density of water (according to Thiesen) at temperatures from 0° to 102°C. Tables 39 and 40 are master scales for the graduation of hydrometers to indicate percentages of ethyl alcohol by weight and by volume and percentages of "Proof Spirit." G. K. B.

GEOLOGY.—*The Noatak-Kobuk region, Alaska.* PHILIP S. SMITH. U. S. Geological Survey Bulletin 536. Pp. 160, with maps and illustrations. 1913.

Practically all of the Noatak-Kobuk region lies north of the Arctic Circle, and as a whole is a mountainous region. The rocks from which the geology of the region has been inferred have been separated into two main divisions, namely, sedimentary and igneous. The sedimentary rocks have been divided into thirteen groups as follows: Unconsolidated deposits consisting of recent stream gravels; recent beach deposits; beach and outwash deposits; Tertiary deposits; the Mesozoic rocks separated into the Bergman, Koyukuk, and Anaktuvuk groups; the Paleozoic rocks subdivided into the Lisburne limestone, Noatak sandstone, Devonian limestone, Silurian limestone, undifferentiated Paleozoic limestones, and undifferentiated Paleozoic metamorphic schists. The last two divisions of Paleozoic rocks may possibly include some rocks of pre-Paleozoic age. The igneous rocks have been subdivided

into four main groups: Basaltic effusives, granitic intrusives, early intrusives and effusives, and greenstones. P. S. S.

GEOLOGY.—*Iron-ore deposits of the Eagle Mountains, California.* E. C. HARDER. U. S. Geological Survey Bulletin 503. Pp. 81, with maps, views and sections. 1913.

The Eagle Mountain iron ores are located in the northern part of the Eagle Mountains, Riverside County, California. The broad structural feature of the northern third of the Eagle Mountains—that is, of the portion consisting of sediments and intrusive granite and where the iron ores occur—is an oval dome, extending in a general east-west direction across the range. The iron ores with associated metamorphic minerals occur as replacements in dolomite. Locally, as at the east end of the area, they have replaced the entire series of dolomite lenses, leaving the associated quartzite but little altered. Elsewhere they occur within the dolomite lenses or beds in bands or as irregular masses roughly parallel to the bedding. The ore is predominantly hematite, but here and there consists of masses of magnetite. Much of the hematite contains disseminated magnetite, making it slightly magnetic, but probably less than 10 per cent of the entire quantity of ore is magnetite.

The succession of geologic events in Eagle Mountain region is as follows: (1) Deposition of sandstone, siliceous shale, and dolomite. (2) Intrusion of porphyritic granite into the sediments. (3) Alteration of granite porphyry to augen gneiss and the sediments to schists and crystalline limestone. (4) Erosion interval followed by submergence and deposition of a great thickness of quartz sandstone; then the deposition of arkosic sandstone, followed by the formation of beds and lenses of dolomite and quartz sandstone, and, lastly, of beds of sandstone and conglomerate. (5) Intrusion of quartz monzonite in two main sills. (6) The heat and pressure accompanying the intrusion recrystallized and consolidated the sediments and perhaps locally developed metamorphic minerals. (7) During the latter part of the intrusion, or shortly after it, iron ores and metamorphic minerals were introduced by deep-seated solutions replacing the dolomite and to a slight extent the quartzite. (8) Doming of the sediments and intrusives, accompanied by great faulting. (9) Erosion exposing all the rock formations, accompanied by the sculpturing of mountains and followed by the development of great outwash aprons around the mountains.

A. H. BROOKS.

GEOLOGY.—*Geology and ore-deposits of the Phillipsburg quadrangle, Montana.* W. H. EMMONS and F. C. CALKINS. U. S. Geological Survey Professional Paper 78. Pp. 271, with maps, views, and sections. 1913.

The consolidated sedimentary rocks range in age from Algonkian to late Cretaceous. The Algonkian Belt series is represented by about 20,000 feet of shale, sandstone and impure limestone. It is overlain, with an unconformity that is locally conspicuous, by the Flathead quartzite of Cambrian age, which constitutes the base of a Palaeozoic series about 4500 feet thick, which consists mainly of limestones, but whose uppermost strata, are quartzitic. These rocks were covered by several thousand feet of Jurassic and Cretaceous sandstone and shale, the latest that survive being of Colorado or Montana age. No structural unconformities are apparent in the Palaeozoic and Mesozoic series, but several epochs are unrepresented by deposits.

Intrusive igneous rocks occupy a large proportion of the surface. With the exception of a few diabasic and dioritic sills, the important intrusive masses are of irregular or dome-like form and are probably of early Tertiary age. Most of them belong to the granite and diorite families. The Phillipsburg batholith, one of the most important economically, is petrographically similar to the Boulder batholith, but less alkalic. The most unusual intrusives are pyroxene aplites, associated with granodiorites or quartz monzonites, some of which contain primary scapolite.

The rocks already described are overlain with marked unconformity by Tertiary tuffs and lavas in small amount, and by stream and glacial deposits of Tertiary and Quaternary age. There is clear evidence of two widely separated glaciations. Remnants of Tertiary erosion surfaces of low relief are well preserved, and the glacial sculpture of the high mountains is striking.

The structure of the pre-Tertiary sedimentary rocks is highly complex. The most remarkable structural features are overthrusts which have pushed Algonkian rocks several miles eastward over rocks as late as Jurassic and which have been folded. These overthrusts are thought to have a close relation with the similar ones in the Rocky Mountains further north and further south, described by Willis, Richards and others. The igneous rocks and the Tertiary gravel deposits have suffered some deformation, but much less than the older strata.

The ore deposits are classified according to mode of occurrence as follows: A. Deposits filling fissures. (1) Silver-bearing veins in granite, (2) Gold-bearing veins in granite, (3) Silver-bearing veins in quartzite,

(4) Gold-bearing veins and sheeted zones in quartzite. B. Replacement deposits related to fissures or to bedding planes. (1) Silver-bearing replacement veins in sedimentary rocks, (2) Silver deposits in bedding-planes of calcareous rocks, (3) Gold-bearing replacements veins in sedimentary rocks. C. Replacement deposits of contact metamorphic origin. (1) Gold-copper deposits, (2) Magnetite deposits. D. Gold placers.

All the important deposits in place are in or near the intrusive bodies. They were deposited by ascending solutions, and it is regarded as probable that these solutions were given off from the intrusives now exposed or from deeper ones that are still concealed. F. C. C.

GEOLOGY.—*Geology of the Nome and Grand Central quadrangles, Alaska.* FRED H. MOFFIT. U. S. Geological Survey Bulletin 533. Pp. 140, with maps and views. 1913.

The Nome and Grand Central quadrangles are situated in the south-central part of Seward Peninsula, Alaska.

Along the southern border of the area is a narrow coastal plain, sloping gently upward from Bering Sea to the foot of the hills a few miles inland while on the north side are the Kigluaik Mountains, whose highest peaks within the quadrangle are about 3,000 feet. The rest of the area is a dissected upland with hills reaching a maximum elevation of about 2600 feet and showing smooth rounded contours.

The oldest rock formation is the Tigaraha schist, the topmost member of the Kigluaik group, which consists of biotite gneisses, coarsely crystalline limestone, biotite schist, and siliceous graphitic schist. The Tigaraha schist is exposed in the most northern part of the area and has a general southerly dip. It is intruded by dikes and sills of granite, diorite and diabase. Overlying the Kigluaik group and occupying nearly all the remainder of the mapped area is the Nome group of formations, made up chiefly of chloritic and feldspathic schists and altered limestones with many greenstone and a few granite intrusives. The age of the Kigluaik and the Nome groups is unknown. They probably range from Paleozoic or pre-Paleozoic to middle Paleozoic. The Quaternary unconsolidated deposits of the area include sands and gravels of marine and of fluvial origin, glacial deposits, and the mantle of unassorted debris due to weathering.

Within the coastal plain five or six of the old beaches have been discovered and these give direct evidence of changes in the relative heights of land and sea. They range in elevation from 34 feet below sea level

to 70 or 79 feet above sea level, and except where removed or uncovered by erosion are buried under later gravel deposits, having a maximum thickness of 120 feet. F. H. M.

GEOLOGY.—*Nitrate deposits.* HOYT S. GALE. U. S. Geological Survey Bulletin 523. Pp. 36. 1912.

This paper consists of a short summary of the natural occurrences of nitrate salts known in the United States. The descriptions are chiefly compiled from the references to such occurrences found scattered throughout geologic and other literature, the use of such deposits as a source of nitrate for the manufacture of powder during war time having been a frequent source of comment. Some new descriptive data by the author and analyses from materials collected in the field are also included. The article contains a review chiefly by quotation, of the theories concerning nitrification as bearing on the probable origin of such deposits. H. S. G.

GEOLOGY.—*The Jurassic flora of Cape Lisburne, Alaska.* F. H. KNOWLTON. U. S. Geological Survey Professional Paper, 85-D. Pp. 55, with sections. 1914.

The Jurassic section of Cape Lisburne, to which the name Corwin formation has been given, reaches the thickness of over 15,000 feet. So far as at present known the fossil flora is uniformly distributed throughout, and embraces 17 species, only one of which is described as new. This flora is compared with known Jurassic floras of various parts of the world, and the conclusion is reached that it is not only undoubtedly Jurassic in age—which had previously been questioned—but belongs either in the upper part of the Middle Jurassic or Brown Jura, or the extreme lower part of the Upper Jurassic or White Jura—that is to say it is probably not older than the Bathonian, and certainly not younger than the Oxfordian. Several pages are devoted to a discussion of the geographic range of Jurassic floras in general, their means and avenues of dispersal, and the probable climatic conditions that prevailed in Alaska at the time this flora flourished there.. F. H. K.

GEOLOGY.—*The origin of colemanite deposits.* HOYT S. GALE U. S. Geological Survey Professional Paper 85-A. Pp. 9, 1913.

Colemanite, the borate of lime from which practically all commercial borax and boric acid is derived in this country at the present time, has been discussed by various writers, but its origin has always been ascribed to the dessication of saline or alkaline waters, usually as deposits of

Tertiary lakes. A study of some of the characteristic colemanite deposits has suggested the probable vein origin of this mineral, without necessary association with dessication deposits. The vein character is indicated in the physical structure of the deposits, which also give evidence of the formation of colemanite by replacement of limestone. The boric acid is assumed to have been derived from volcanic sources, since volcanic activity has characterized the region in which these deposits occur, and intrusive or flow rocks are generally found in intimate association with the ore bodies. H. S. G.

GEOLOGY.—*Geology and ore deposits of Lemhi County, Idaho.* J. B. UMPLEBY. U. S. Geological Survey Bulletin 528. Pp. 182, with maps, sections and views. 1913.

The rock formations of Lemhi County, Idaho, include: (1) a gneissoid granite of Archean age, (2) a widespread series of Algonkian schists, slates and quartzites, (3) about 6000 feet of Paleozoic strata which include Cambrian quartzite, Ordovician, Silurian (?), and Devonian dolomitic limestones, and Mississippian limestone, (4) large batholithic masses of granite, and (5) Tertiary lavas and lake-beds.

The ore deposits may be grouped as gold placers and lodes, lead-silver veins and tabular replacements, copper-bearing gold veins, cobalt-nickel deposits, and tungsten-bearing veins. Two epochs of mineralization are recognized, the older late Cretaceous or early Eocene and the younger late Miocene or early Pliocene. All of the deposits, except a small group of gold-silver veins, belong to the earlier epoch.

The gold-bearing veins are inclosed in many types of rock in Lemhi County, but few of them are far distant from rocks of the granite rhyolite family. Lead-silver deposits are recognized only in the southeastern part of the county and at present are affording the principal production. They are inclosed in Paleozoic formations and are thought to be genetically related to a quartz diorite facies of the granite intrusion. The copper deposits have not proved of noteworthy commercial importance. Cobalt-nickel deposits occur in only one of the nineteen mining districts in the county. They occur as lens-like bodies and as bunches and disseminations along fractured zones. Some of them are known to contain about 2 per cent each of cobalt and nickel. Tungsten is mined in one district where it is associated with zinc, copper, lead, molybdenum, iron and silver minerals in lenticular quartz veins. J. B. U.

PROCEEDINGS OF THE ACADEMY AND AFFILIATED SOCIETIES.

THE ANTHROPOLOGICAL SOCIETY OF WASHINGTON

A special meeting of the Anthropological Society of Washington was held February 3, 1914, in the National Museum, the President, Mr. Stetson, in the chair. About eighty persons were present.

Miss FRANCES DENSMORE, of the Bureau of American Ethnology, read a paper on *Sioux War Songs*, using the stereopticon, the phonograph, and vocal selections in illustration of her theme. She first showed lantern slides of the prairie, where the long war drama of the Sioux was enacted, then portraits of some old Sioux warriors, and, last, a number of native drawings of war incidents. Many war customs were illustrated by the details, as well as by the subjects, of these drawings. One phonograph record of a woman's voice was given in connection with the portrait of a woman who sang a song in honor of a relative killed in war. The remaining songs were given vocally, the melodies being those sung by the Indians, but no effort being made to imitate the Indian manner of singing. Each drawing had one or more songs which were either sung at the time the incident occurred, or composed in honor of the event. These songs were phonographically recorded by the men who made the drawings, and were afterward transcribed in musical notation by the writer.

It is said that the Sioux, among all the Indian tribes, were the best as friends and the worst as enemies. They were indeed men to be feared in the old days. One of their societies was well named the "Strong Hearts." They were trained from childhood to have "strong hearts," and they held to a purpose when others failed. The warriors of a certain society carried in war a lance to which was fastened the skin of a crow. When that lance was planted in the ground they dared not retreat from it. So in loyalty to a friend, or in hatred of an enemy, they struck their lance into the ground and staid by it.

War among Indians had an aspect different from that which it has among civilized nations. It was not an occasional calamity, it more nearly resembled a steady occupation. To the individual it offered a career. A man could best become rich and honored by going to war. A man was rated according to his generosity, and having given away his goods there must be some way of securing a new supply of wealth. A war party afforded this opportunity. War was a means of revenge, and Indian revenge was a terrible thing. War was for the defence of the home, and the protection of the hunting ground which meant the food supply. Indian warfare was, after all, the physical expression of

something which must always go on, only changing its form, as forces do, and passing from physical to mental battle grounds.

There was much of interest on the warpath besides the killing of enemies and the capture of horses. A war party traveled far and brought back strange tales of distant lands. New customs were frequently introduced into the tribe as a result of war expeditions or the taking of captives.

Only a successful warrior could belong to the leading societies of the tribe, with their special tents for meeting, their feasts and their parades, all of which were very attractive to the Indian. But the greatest reward was the right to sing of one's valor, at the assemblages of the tribe.

DANIEL FOLKMAR, *Secretary.*

THE CHEMICAL SOCIETY

The 235th meeting was held at the Cosmos Club on February 12, 1914. The following papers were read:

F. P. DEWEY, of the Bureau of the Mint: *Artificial sperrylite.* Sperrylite, $PtAs_2$, which is especially interesting as the only chemical compound containing Pt found in nature, has been duplicated in a matte made in the refinery of the San Francisco Mint. The product is beautifully crystallized and closely resembles the original sperrylite found at Sudbury.

P. H. WALKER, of the Bureau of Chemistry: *Note on a new extraction apparatus.* This apparatus, which is made of iron and copper tubing and is free from rubber connections, was shown and briefly described.

Discussion: Chamberlaine spoke of the method of extraction by repeated washings without a condenser.

F. K. CAMERON, of the Bureau of Soils: *Potash from kelp.* Four principal sources of potash have been in view: (1) desert salt deposits, (2) orthoclase, feldspar and leucite, (3) alunite, (4) the giant kelps of the Pacific. Four types of kelp yield considerable amounts of potassium chloride, which effloresces on the plant during drying. This salt can be separated from the sodium chloride without difficulty, but no method has been worked out for separating the potash while leaving the large amount of available nitrogen behind with the organic matter, thus giving the organic residue a value. It is estimated that the Pacific kelps could supply six times the amount of potash now imported into the United States. Lantern slides were shown illustrating the beds of kelp as they occur, from Southern California to Alaska, the appearance and manner of growth of the different species, and the methods of harvesting and loading now in commercial use in the South.

Discussion: In reply to inquiries by Andrews, Bunzel, Seidell, Sosman, and Bassett, the following points were brought out: Very little of the nitrogen is present as nitrate. The potash is not all removed by a single extraction. Only one company is operating on any considerable scale, although a number of companies have been floated; considerable kelp is being cut on the Mexican coast, where it is easily air dried. Capital has held back from investment in kelp-cutting largely because no monopoly rights or patents are connected with the industry. Data are

lacking for a comparison of the relation of iodide to chloride in sea water with the same ratio in the plants. Houston discussed various points brought out by the lecturer, and suggested that the bulkiness of the kelp fertilizer is in some respects a desirable property; also that the present state of the fertilizer industry is not such as to encourage investment in new fertilizer ventures, one principal trouble being overproduction of mineral fertilizers both in the United States and Germany.

ROBERT B. SOSMAN, *Secretary.*

THE GEOLOGICAL SOCIETY OF WASHINGTON

The 276th meeting was held at the Cosmos Club, December 10, 1913.

Presidential address. *The Tertiary orogeny of the North American Cordillera and its problem.* FREDERICK L. RANSOME. In extended form this address will be published with other Silliman lectures for 1913 in a Dana memorial volume by Yale University.

The 21st Annual Meeting was then held at which the following officers were elected to serve for the ensuing year: President, ARTHUR KEITH; Vice-presidents, T. WAYLAND VAUGHAN, ARTHUR C. SPENCER; Treasurer, SIDNEY PAIGE; Secretaries, FRANK L. HESS, CLARENCE N. FENNER; Members-at-large of the Council, ERNEST F. BURCHARD, CHARLES W. GILMORE, D. F. HEWETT, ESPER S. LARSEN, G. C. MARTIN. Vice-president, Washington Academy of Sciences, FREDERICK L. RANSOME.

The 277th meeting was held at the Cosmos Club, January 14, 1914.

Under the head of "Informal Communications" E. G. WOODRUFF described a well at DeBeque, Colorado, with periodic discharges of oil, gas, and water.

REGULAR PROGRAM

Comparison of the geologic history of the Florida Reef tract with that of other reef areas (illustrated): T. WAYLAND VAUGHAN. The paper is published in *Journ. Washington Acad. Sci.* **4**: 26–34. 1914.

Some ellipsoidal lavas on Prince William Sound, Alaska (illustrated): S. R. CAPPS. Near Ellamar, Alaska, there is a series of several thousand feet of diabasic and basaltic lava flows interbedded at frequent intervals with water-laid sediments. Many of the flows show ellipsoidal, spheroidal, or pillow-shaped forms. It is believed that the alternation of marine sediments with lava flows, all being structurally comformable, gives strong evidence that the flows were poured out under water, and that in this area the ellipsoidal forms of the lavas are due to sub-aqueous cooling.

The original top of a flow, where overlain by sediments, is found to have an uneven surface, the sediments filling in the irregularities. The bottom of the sedimentary bed is thus uneven. The top of a sedimentary bed has an even surface, and the lavas outpoured upon it have themselves conformed to this surface, and the flow is therefore smooth on the bottom. This distinction was of great value in deciphering the structure in an area of considerable metamorphism and steeply tilted rocks.

Review of papers by L. Keith Ward (*a*) *The relationship between the ore bodies and the igneous rocks of the Heemskirk-Comstock-Zeehan region, Tasmania.* (*b*) *The origin of certain contact rocks high in lime and magnesia.* A. C. SPENCER. No abstract.

The 278th meeting was held at the Cosmos Club, January 28, 1914.

Under the head of "Informal Communications," J. M. HILL, described a copper deposit in an apparent sink hole in northeastern Arizona.

REGULAR PROGRAM

Bituminous shale in northwestern Colorado and northeastern Utah: E. G. WOODRUFF and D. T. DAY. In general this region is a moderately dissected plateau containing many small badland areas. Both Cretaceous and Tertiary rocks outcrop, but the bituminous shale was found only in the middle member of the Green River (Eocene) formation. The formation as a whole is a little more than 2,000 feet thick in the eastern part of the area but considerably less in the western part. Bituminous shale was found in long lenticular beds ranging from a fraction of an inch up to 80 feet in thickness. An exposure half a mile long shows only a moderate variation in thickness but a study of a township reveals great differences in thickness and continuity.

The shale is a brown tough rock with a light brown, waxy streak. The amount of carbonaceous material present varies considerably. The major bedding and a large part of the minor bedding is regular, but in most of the rich shale there is an irregularity of lamination which gives to it a peculiar curly structure.

Both field evidence and microscopic studies show that the movement of oil in the shale has not been extensive nor even locally intensive. Microscopic studies show also that the shale contains a considerable amount of oil which can be liberated by leaching. Greater quantities of oil, however, are obtained by ordinary distillation processes. The results of distillation tests are shown by the following table:

NUMBER OF TEST	PART OF SECTION SAMPLED	AMOUNT OF SHALE USED	AMOUNT OF OIL OBTAINED	GALLONS OF OIL PER SHORT TON OF SHALE
		lbs.	*gal.*	
Conn Creek	1½ ft.	100	3.06	61.2
Kimball Creek	6 ft.	150	2.375	31.6
Kimball Creek (second test)	6 ft.	156	2.03	26.2
Parachute Creek	5 ft. 10 in.	150	1.5	20.0
4A Ranch	5 ft. 10 in.	150	0.78	10.4
Temple Station	4 ft.	120	2.711	45.2
Ute Station	2 ft.	120	0.96	16.0
White River. Subsurface sample	3 ft. 6 in.	150	2.5	33.3
White River. Near surface	3 ft. 6 in.	135	2.4	35.5
Nine Mile Creek	6 in.	105	2.05	39.0
Hill Creek	9 in.	135	1.27	16.0

It is estimated that sufficient gas is generated during distillation to carry on the operation without the addition of other fuels. Different samples of the oil began to boil at from 70° to 80°. From 2 to 10 per cent of the oil was distilled under 150°. From 33 to 55 per cent of the oil volatized between 150° and 300°. The residues varied from 44 to 66 per cent. The amount of ammonia contained in the shale has not yet been determined. These data indicate that the bituminous shale is a valuable resource. The deposits are easily accessible by railroad, pipe lines or tram tracks.

The conditions of "antiplanation" in sub-Arctic regions (illustrated): H. M. EAKIN. A widely distributed topographic feature in central and western Alaska, the development of which is apparently peculiar to those regions of the earth's surface that are exposed to the rigors of a sub-Arctic climate was described as essentially flat-topped accumulations of loose rock. They include flat-topped hills, ridges, passes and terrace-like forms. The materials involved have migrated under the thrust and heave of frost action in moisture saturated soil. They have been moved at extremely slow rates and for very short distances. Inequalities in the amount of soil mingled with the rock waste cause different parts of the accumulating mass to move at different rates. These irregularities are mutually cumulative and the slopes which they affect become more and more irregular and finally exhibit the flats and scarps here discussed. These phenomena indicate the action of a morphologic process distinct from the processes of aqueous erosion, which oppose its operation; distinct from equiplanation which, according to Cairnes, is a process affecting more widespread, regional areas, and which reduces relief by the migration of materials from hills to valleys; and distinct from the general phenomena of solifluction in being localized in its operation and in resulting in a special and distinct type of topographic feature. The process is termed antiplanation—a specific process that is active in forming high level flats and plains of limited extent wherever the essential conditions are met.

Problems of the glacial geologist: FRANK LEVERETT. Certain problems, such as the cause of the glacial epoch, the alternation of glacial and interglacial stages, the origin and relations of loess deposits, etc., are world-wide in bearing. Others, such as the localization of the ice centers of North America and the Iowan drift question are regional. There are also collateral problems such as the effect of the ice load in producing deformation of the earth's crust, the effect of climatic changes of the ice age upon migration, extinction of species, and the development of new species. To the glacialist also fall certain determinations leading to a geologic time scale through combining data on cataract recession, ice-border recession, uplift of shore lines of glacial lakes, relative amounts of weathering, and erosion of the several drifts, etc.

The cause of the glacial epoch, which was thought by many, a generation ago, to be solved by Croll, is generally regarded today as an unsolved or but partially solved problem. Chamberlin and students under his direction have in the past twenty years thoroughly considered many

terrestrial factors affecting climate and the varying relations of the ocean and the air under differing conditions of temperature as well as reactions involved in exposure of fresh areas to oxidation and weathering. The ingenious hypothesis of the cause of glaciation advanced by Chamberlin as a result of these studies is full of suggestive ideas which but few students have as yet had time adequately to consider.

As to the manner in which the ice sheet accumulated on the North American continent very little has as yet been determined. Conditions are much more complex here than in Europe and a solution seems likely to require about as elaborate an investigation as is required to determine the cause of the ice age. If, as seems likely, the Labrador center was fed by moist air currents from the Gulf of Mexico, and the Keewatin by those from the Pacific, it becomes a problem to explain the recently announced Patrician center north of Lake Superior. It is also difficult to account for the development and great extent of the Keewatin center under present conditions of altitude and slope. There are, however, indications that in early Pleistocene time the coast ranges of Alaska were much lower than now and they may have had less influence in checking the winds from the Pacific and in causing precipitation to be chiefly near the coast.

There is wide difference of opinion concerning the climatic conditions at the time of loess deposition and it remains to be determined whether the loess is interglacial or glacial. The opinion is almost unanimous that it is chiefly of eolian deposition, water being influential merely in distributing it down the great waterways and exposing it to the action of the wind. To what extent the loess is derived from the glacial materials and to what extent from the semi-arid western plains is undetermined.

The question of a stage of glaciation closely connected with the main loess deposition is still open. It is here that the Iowan glacial stage was originally placed. Opinions on the Iowan drift are now quite diverse, its existence being questioned by some, its Illinoian age being claimed by others, while a number of geologists still place it close to the main loess deposition and claim for it a much later time that the Illinoian.

The 279th meeting was held at the Cosmos Club, February 11, 1914.

Under the head of "Informal Communications," DEAN WINCHESTER described the anticlines of eastern Montana, Wyoming and North Dakota.

REGULAR PROGRAM

The Cannonball marine member of the Lance formation: E. R. LLOYD. The Lance formation in parts of the Dakotas consists of two parts; a lower part, approximately 400 feet thick, with predominant somber colored shale and yellow sandstone, of continental origin; and an upper part, about 300 feet thick of sandstone, shale, and limestone of marine origin. To this upper part the name Cannonball marine member is given. The lower sediments of continental origin contain a flora which

according to Knowlton is indistinguishable from that of the Fort Union and is distinctly a Tertiary flora. It also contains remains of turtles and dinosaurs, particularly of the genus Triceratops which is diagnostic of the Lance formation and which has, at least until recently, been considered by vertebrate paleontologists to be a distinctively Cretaceous form. The Cannonball member contains an invertebrate and vertebrate fauna of over forty species very closely related to the marine cretaceous fauna of the Fox Hills sandstone.

The distinctively marine fossils of the Cannonball member were found near Haley, N. D., by C. J. Hares, and on Cannonball River, N. D., by E. R. Lloyd at about the same time in 1912. The member is thicker and better exposed on Cannonball River and this was accordingly selected as the type locality. The strata are practically flat lying, but a comparison of altitudes instrumentally determined on lignite beds in the Fort Union show a small but persistent dip to the northeast and north. The Cannonball member has been traced and mapped in a strip extending from near Mandan, North Dakota, to the eastern part of Harding County, South Dakota, a distance of about 130 miles. The marine fossils were found throughout the whole of this distance.

The mechanics of granite intrusion in the Black Hills, South Dakota. SIDNEY PAIGE. In the Black Hills schists and quartzites form the matrix for invading granite masses. The schists suffered marked deformation in the vicinity of the intrusive masses, being thrown into closely appressed recumbent folds and receiving a second schistose structure. Parallel with this new structure there has been *lit-par-lit* injection. The quartzite broke into blocks which became separated by the advancing magma. These features suggest that the conditions under which the intrusion occurred involved the lateral distension of the invaded rocks though this distension took place under a great load. There is no evidence that the magma was able to dissolve fragments of the schist upon a large scale, and it seems that such assimilation as may have occurred was merely incidental to physical or mechanical features, and not a primary process inducing or permitting the advance of the magma. Through injection and impregnation the composition and specific gravity of the schist approaches that of the granite. The prime cause of the advance of deep seated magmatic material is probably to be sought in movements incidental to adjustments toward isostatic equilibrium. As sea bottoms sink there is a landward transfer of material, and continents rise. Where there are weak spots strong warps develop, lateral distension results, and the upward invasion of the magma is permitted.

FRANK L. HESS, *Secretary.*

REFERENCES

Under this heading it is proposed to include, by author, title, and citation, references to all scientific papers published in or emanating from Washington. It is requested that authors coöperate with the editors by submitting titles promptly, following the style used below. These references are not intended to replace the more extended abstracts published elsewhere in this JOURNAL.

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DYAR, H. G. *The larva of* Trichostibas parvula *(Lepidoptera, Yponomentidae).* Insecutor Inscitiae Menstruus **1**: 48, 49. April 30, 1913.

DYAR, H. G. *Another larva of* Xanthopastis timais *(Lepidoptera, Noctuidae).* Insecutor Inscitiae Menstruus **1**: 49, 50. April 30, 1913. (Gives a key to distinguish the four known larval forms.—J. C. C.)

DYAR, H. G. *The larva of* Delias henningia *Eschscholtz (Lepidoptera, Pieridae).* Insecutor Inscitiae Menstruus **1**: 58. May 31, 1913.

DYAR, H. G. *A galleriine feeding in cacao pods (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1**: 59. May 31, 1913. (Describes the new genus Tineopsis, with a single species, *T. theobromae*, sp. nov.—J. C. C.)

DYAR, H. G. *Note on the systematic position of* Pseudacontia rhizoleuca *Brabant (Lepidoptera, Noctuidae).* Insecutor Inscitiae Menstruus **1**: 59, 60. May 31, 1913. (Describes the new genus Brabantia, with a single species, *B. rhizoleuca*, from South America.—J. C. C.)

DYAR, H. G. *A note on* Talara ruficollis *Schaus (Lepidoptera, Lithosiidae).* Insecutor Inscitiae Menstruus **1**: 75. June 30, 1913. (Describes Paraprepia and Parillice, new genera, and one new species from Brazil.—J. C. C.)

DYAR, H. G. *The species of* Calyptocome *Warren (Lepidoptera, Geometridae).* Insecutor Inscitiae Menstruus **1**: 79–87. July 21, 1913. (Gives a key to the American species and describes thirteen new species.—J. C. C.)

DYAR, H. G. *The separation of some species of Lineodus (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1:** 94–96. August 23, 1913. (Gives a key to some of the American species and describes three new species.—J. C. C.)

DYAR, H. G. *Descriptions of six new Pyralidae from British Guiana.* Insecutor Inscitiae Menstruus **1:** 98–100. August 23, 1913.

DYAR, H. G. *A note on* Diathrausta nerinalis *Walker (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1:** 100–102. August 23, 1913. (Describes four new forms of this species.—J. C. C.)

DYAR, H. G. *Notice of volume II, no. 4, of Barnes and McDunnough's "Contributions to the Natural History of the Lepidoptera of North America."* Insecutor Inscitiae Menstruus **1:** 102–106. August 23, 1913. (Gives the synonomy of many of the species described as new in this article and describes one new species from Cuba.—J. C. C.)

DYAR, H. G. *Note on the American silvery species of Argyria (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1:** 111–114. September 15, 1913. (Gives a key to the American species which have silvery white ground color and describes seven new species.—J. C. C.)

DYAR, H. G. *An additional note on Calyptocome.* Insecutor Inscitiae Menstruus **1:** 120. September 15, 1913.

DYAR, H. G. *Notes on the species of* Galasa *Walker (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1:** 125–129. October 30, 1913. (Gives a key to the American species and describes five as new.—J. C. C.)

DYAR, H. G. *A new pyralid from Newfoundland (Lepidoptera, Pyralidae).* Insecutor Inscitiae Menstruus **1:** 139. November 29, 1913. (Describes *Pyrausta Beddeci,* sp. nov.—J. C. C.)

DYAR, H. G., AND KNAB, F. *Three new neoptropical mosquitoes.* Insecutor Inscitiae Menstruus **1:** 76–78. June 30, 1913.

ELY, C. R. *Notes on the cocoons of some of the species of the genus Acrobasis, and descriptions of three new species, from East River, Connecticut.* Insecutor Inscitiae Menstruus **1:** 51–57. May 31, 1913.

ELY, C. R. *The food plant of* Cleonus calandroides *Rand.* Proceedings of the Entomological Society of Washington **15:** 104, 105. October 2, 1913. (This species lives in the roots of *Cakile endetula.*—J. C. C.)

FOLSOM, J. W. *North American spring-tails of the subfamily Tomocerinae.* Proceedings of the U. S. National Museum **46:** 451–472, pls. 40–41. December 30, 1913. (Includes descriptions of one new species of Tritomurus and of one new species and one new variety of Tomocerus.—J. C. C.)

FORBES, W. T. M. Trichoclea ruisa, *new species; A structurally aberrant noctuid (Lepidoptera, Noctuidae).* Insecutor Inscitiae Menstruus **1:** 74, 75. June 30, 1913.

FOSTER, S. W. *The cherry fruit sawfly.* Bureau of Entomology Bulletin 116, Pt. 3, pp. 73–79, pls. 9, 10. January 31, 1913. (A brief seasonal history of this species, *Hoplocampa Cookei,* in California.—J. C. C.)

GAHAN, A. B. *Identity of* Scotioneurus stenostigma *Prov.* Proceedings of the Entomological Society of Washington **15:** 38–40. April 9, 1913. (Species redescribed from type specimens and transferred to genus Aspilota.—J. C. C.)

GAHAN, A. B. *Some notes on the palpi of Aphidiinae.* Proceedings of the Entomological Society of Washington **15:** 86, 87. June 10, 1913. (The maxillary

palpi of *Diaeretus rapae* are almost as frequently three-segmented as four-segmented; examination of large series of specimens of other species of the subfamily showed no variation.—J. C. C.)

GILL, J. B. *The fruit-tree leaf-roller.* Bureau of Entomology Bulletin 116, Pt. 5, pp. 91–110, pls. 12–16. March 12, 1913. (Discusses the life-history and habits of *Archips argyrospila*, with notes on natural enemies and method of control.—J. C. C.)

GIRAULT, A. A. *A new scelionid from Queensland, Australia, parasitic on acridiid eggs, with diagnosis of Australian species.* Proceedings of the Entomological Society of Washington **15**: 4–8. April 9, 1913. (Contains also a key to the Australian species of the genus Scelio.—J. C. C.)

GIRAULT, A. A. *Critical notes on some species of Mymaridae from the Sandwich (Hawaiian) Islands, with comparative notes on Australian, North American, and European forms.* Proceedings of the Entomological Society of Washington **15**: 9–20. April 9, 1914. (Describes one new species and one new variety of the genus Polynema.—J. C. C.)

HEIDEMAN, O. *Description of two new species of North American Tingitidae.* Proceedings of the Entomological Society of Washington **15**: 1–4. April 9, 1913.

HOOD, J. D. *Two new Thysanoptera from Porto Rico.* Insecutor Inscitiae Menstruus **1**: 65–70, pl. 1. June 30, 1913. (Includes description of the new genus Podothrips.—J. C. C.)

HOOD, J. D. *On a collection of Thysanoptera from Porto Rico.* Insecutor Inscitiae Menstruus **1**: 149–154, pl. 5. December 31, 1913. (Describes the new genus Dinurothrips, founded upon *D. Hookeri*, sp. nov.—J. C. C.)

JONES, P. R., AND DAVIDSON, W. M. *Life history of the codling moth in the Santa Clara valley of California.* Bureau of Entomology Bulletin 115, Pt. 3, pp. 113–181. January 18, 1913. (Methods of control also are treated.—J. C. C.)

KNAB, F. *Some nectropical Syrphidae (Diptera).* Insecutor Inscitiae Menstruus **1**: 13–15. February 20, 1913. (Describes Quichuana, new genus, with two new species.—J. C. C.)

KNAB, F. *Names and synonomy in Anopheles (Diptera, Culicidae).* Insecutor Inscitiae Menstruus **1**: 15–17. February 20, 1913.

KNAB, F. *Some earlier observations on the habits of* Aphiochaeta juli *(Brues). (Diptera, Phoridae).* Insecutor Inscitiae Menstruus **1**: 24. February 20, 1913.

KNAB, F. *A new bromelicolous Megarhinus (Diptera, Culicidae).* Insecutor Inscitiae Menstruus **1**: 35, 36. March 29, 1913.

KNAB, F. *Changes in the mosquito-fauna of Panama.* Proceedings of the Entomological Society of Washington **15**: 40–42. April 9, 1913. (Changes of the physical features of Panama, due to the canal construction and the consequent formation of Gatun Lake, have brought about a great increase in the numbers of certain species of mosquitoes previously found to occur in very small numbers.—J. C. C.)

KNAB, F. *A new Heterostylum from Mexico (Diptera, Bombyliidae).* Insecutor Inscitiae Menstruus **1**: 110, 111. September 15, 1913.

KNAB, F. *The contentions regarding "Forest malaria."* Proceedings of the Entomological Society of Washington **15**: 110–114. October 2, 1913. (A

reply to an article by Dr. Lutz reiterating a belief that the epidemics of malaria in question were caused by other than bromelicolous Anopheles.—J. C. C.)

KNAB, F. *A new Cuban Chaoborus (Diptera, Culicidae).* Insecutor Inscitiae Menstruus **1**: 121, 122. October 30, 1913.

KNAB, F. *A new American Phlebotomus (Diptera, Psychodidae).* Insecutor Inscitiae Menstruus **1**: 135–137, fig. 1. November 29, 1913. (Describes a new species, *P. atroclavatus*, from Trinidad.—J. C. C.)

KNAB, F. *A note on some American Simuliidae.* Insecutor Inscitiae Menstruus **1**: 154–156. December 31, 1913. (The new name *Simulium Lutzi* is proposed for *S. exiguum* Lutz, not of Roubaud.—J. C. C.)

LUTZ, A. *The insect host of forest malaria.* Proceedings of the Entomological Society of Washington **15**: 108, 109. October 2, 1913. (*Cellia argyrotarsis* is said to be much more responsible for the spreading of malaria in Brazil than *C. albimana*.—J. C. C.)

MALLOCH, J. R. *A new genus and two new species of Chloropidae (Diptera).* Insecutor Inscitiae Menstruus **1**: 46–48. April 30, 1913. (Includes description of Eugaurax, a new genus based upon *E. floridensis*, n. sp., from Florida.—J. C. C.)

MALLOCH, J. R. *Four new species of North American Chloropidae (Diptera).* Insecutor Inscitiae Menstruus **1**: 60–64. May 31, 1913.

MALLOCH, J. R. *A new species of Agromyzidae (Diptera).* Insecutor Inscitiae Menstruus **1**: 109, 110. September 15, 1913. (Describes *Milichia orientalis* from the Island of Guam.—J. C. C.)

MALLOCH, J. R. *A new species of Simulium from Texas.* Proceedings of the Entomological Society of Washington **15**: 133, 134. October 2, 1913.

MALLOCH, J. R. *Two new species of Borboridae from Texas.* Proceedings of the Entomological Society of Washington **15**: 135–137. October 2, 1913.

MARSH, H. O. *The horse-radish webworm.* Bureau of Entomology Bulletin 109, Pt. 7, pp. 71–76. January 30, 1913. (A short life-history of this species, *Plutella armoracia*, occurring in Colorado.—J. C. C.)

MARSH, H. O. *The striped beet caterpillar.* Bureau of Entomology Bulletin 127, Pt. 2, pp. 13–18, pl. 5. May 19, 1913. (A short account of the life-history of *Mamestra trifolii* in Colorado and Kansas, with a list of its natural enemies and recommendations for control.—J. C. C.)

MORGAN, A. C. *An enemy of the cigarette beetle.* Proceedings of the Entomological Society of Washington **15**: 89. June 10, 1913. (Larvae and adults of the Clerid beetle, *Thaneroclerus girodi*, are predaceous, feeding on the cigarette beetle, in the larval, pupal, and adult stages.—J. C. C.)

PARKER, W. B. *The hop aphis in the Pacific region.* Bureau of Entomology Bulletin 111: 1–43, pls. 1–10. May 6, 1913. (The life-history, habits, damage, natural enemies and control of this species, *Phorodon humuli*, are given at length.—J. C. C.)

PARKER, W. B. *The red spider on hops in the Sacramento valley of California.* Bureau of Entomology Bulletin 117: 1–41, pls. 1–6. May 3, 1913. (Discusses the life-history and habits of *Tetranychus bimaculatus*, with methods of control.—J. C. C.)

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